AMENDMENTS TO THE CLAIMS:

This listing of claims replaces all prior versions and listings of claims in the application.

LISTING OF CLAIMS:

1. (Currently Amended) A transistor comprising:

an emitter region;

a collector; and

a base layer having a base contact, the base layer comprising:

an intrinsic region between the emitter region and the collector;

an extrinsic region between the intrinsic region and the base contact; and

a first doping layer that is doped with a trivalent substance, that extends into the extrinsic region, and that is counter-doped with a pentavalent substance from ~~in a region adjacent to~~ the emitter region;

wherein the base layer comprises carbon atoms having a concentration greater than 1×10^{18} cm^{-3}.

2. (Previously Presented) The transistor of claim 1, wherein the trivalent substance comprises boron.

3. (Previously Presented) The transistor of claim 1, wherein the base layer further comprises:

a second doping layer that is doped with a trivalent substance, and that is between the first doping layer and the collector; and

a third doping layer that is doped with a trivalent substance, and that is between the second doping layer and the collector;

wherein a concentration of trivalent substance in the second doping layer is less than a concentration of trivalent substance in the first doping layer, and the concentration of trivalent substance in the second doping layer is less than a concentration of trivalent substance in the third doping layer.

4. (Previously Presented) The transistor of claim 1, wherein the first doping layer comprises at least 30% of a total amount of a doping substance in the base layer.

5. (Previously Presented) The transistor of claim 1, wherein the base layer further comprises:

a substance diffused into the base layer from a region that corresponds to the collector.

6. (Cancelled)

7. (Previously Presented) The transistor of claim 3, wherein the first doping layer comprises at least 30% of a total amount of a doping substance in the base layer.

8. (Previously Presented) The transistor of claim 3, wherein the base layer further comprises:

a substance diffused into the base layer from a region that corresponds to the collector.

9. (Cancelled)

10. (Previously Presented) The transistor of claim 3, wherein the trivalent substance comprises boron.

11. (Previously Presented) The transistor of claim 3, wherein the second doping layer and the third doping layer are doped with germanium;

12. (Previously Presented) The transistor of claim 11, wherein:

a concentration of germanium in the second doping layer and the third doping layer decreases from a high point at the collector to a low point in the second layer; and

a decrease in the concentration of germanium from the high point to the low point is substantially constant.

13. (Currently Amended) A transistor comprising:

a base layer comprising:

a first doping layer that is doped with a trivalent substance;

a second doping layer adjacent to the first doping layer and having a lower concentration of the trivalent substance than the first doping layer; and

a third doping layer adjacent to the second doping layer and having a higher concentration of the trivalent substance than the second doping layer;

wherein the first doping layer and the second doping layer are counter-doped with a pentavalent substance ~~in~~ <u>from</u> an emitter region of the transistor<u>; and</u>

<u>wherein the base layer comprises carbon atoms having a concentration greater than $1x10^{18}$ cm^{-3}</u>.

14. (Previously Presented) The transistor of claim 13, wherein the second doping layer and the third doping layer are doped with germanium.

15. (Previously Presented) The transistor of claim 14, wherein a concentration of germanium in the second doping layer and the third doping layer decreases from a high point at a collector region of the transmitter to a low point in the second layer.

16. (Previously Presented) The transistor of claim 14, wherein a decrease in the concentration of germanium from the high point to the low point is substantially constant.

17. (Previously Presented) The transistor of claim 11, wherein the trivalent substance comprises boron.

18. (Previously Presented) The transistor of claim 11, wherein the pentavalent substance comprises arsenic having a concentration of between $1x10^{20}$ cm^{-3} and $1x10^{21}$ cm^{-3}.

19. (Currently Amended) A transistor comprising:

a collector ~~region~~;

an emitter region; and

a base layer between the collector ~~region~~ and the emitter region, the base layer comprising:

an intrinsic region between the collector and the emitter region; and

an extrinsic region outside the intrinsic region;

wherein the intrinsic region and the extrinsic region comprise plural layers that are doped with different concentrations of a trivalent substance; ~~and~~

wherein at least some of the plural layers in the intrinsic region are doped, from the emitter region, with a pentavalent substance; and

wherein the base layer comprises carbon atoms having a concentration greater than $1x10^{18}$ cm^{-3}.

20. (Currently Amended) The transistor of claim 19, wherein:

at least some of the plural layers in the intrinsic region are doped, from the collector ~~region~~, with germanium;

a concentration of the germanium decreases from a high point at the collector ~~region~~ to a low point in one of the plural layers doped with the trivalent substance; and

a decrease in the concentration of germanium from the high point to the low point is substantially linear.

21. (New) The transistor of claim 1, wherein the base layer further comprises a second doping layer and a third doping layer, the second doping layer and the third doping layer each being doped with a dopant, the first doping layer, the second doping layer, and the third doping layer being separated from the emitter region by a portion of the base layer.

22. (New) The transistor of claim 1, wherein the first doping layer comprises a concentration of the trivalent substance that is between $1x10^{18}$ cm^{-3} and $5x10^{20}$ cm^{-3}.

23. (New) The transistor of claim 1, wherein the base layer further comprises:

a second doping layer that is doped with a dopant, wherein the second doping layer comprises a concentration of the dopant that is between $1x10^{18}$ cm^{-3} and $1x10^{19}$ cm^{-3}; and

a third doping layer, the second doping layer being between the first doping layer and the third doping layer.

24. (New) The transistor of claim 1, wherein the base layer further comprises:

an additional doping layer that is doped with a dopant and that is adjacent to the collector, wherein the additional doping layer comprises a concentration of the dopant that is between $5x10^{18}$ cm^{-3} and $1x10^{20}$.

25. (New) The transistor of claim 1, wherein the base layer further comprises:

a second doping layer that is doped with a dopant; and

a third doping layer that is doped with a dopant, the second doping layer being between the first doping layer and the third doping layer;

wherein the second doping layer has a lower concentration of dopant than both the first doping layer and the third doping layer.

26. (New) The transistor of claim 1, wherein the base layer further comprises:

a second doping layer that is doped with a dopant, the second doping layer being between the first doping layer and the collector;

wherein the second doping layer is counter-doped with the pentavalent substance, the pentavalent substance penetrating at least half-way through the second doping layer; and

wherein the second doping layer comprises a concentration of the pentavalent substance that is between $1x10^{20}$ cm^{-3} and $1x10^{21}$ cm^{-3}.

27. (New) The transistor of claim 1, wherein the base layer further comprises:

a second doping layer that is doped with a dopant; and

a third doping layer that is doped with a dopant, the second doping layer being between the first doping layer and the third doping layer;

wherein a PN junction generated by counter-doping with the pentavalent substance is in about a middle of the second doping layer.

28. (New) A transistor comprising:

an emitter region;

a collector; and

a base layer having a base contact, the base layer comprising:

an intrinsic region between the emitter region and the collector;

an extrinsic region between the intrinsic region and the base contact; and

a first doping layer that is doped with a trivalent substance, that extends into the extrinsic region, and that is counter-doped with a pentavalent substance from the emitter region, wherein the first doping layer comprises a concentration of the trivalent substance that is between $1x10^{18}$ cm^{-3} and $5x10^{20}$ cm^{-3};

a second doping layer that is doped with the trivalent substance, that extends into the extrinsic region, and that is counter-doped, at least part-way through, with a pentavalent substance from the emitter region, wherein the second doping layer comprises a concentration of the pentavalent substance that is between $1x10^{20}$ cm^{-3} and $1x10^{21}$ cm^{-3}, wherein the second doping layer comprises a concentration of the trivalent substance that is between $1x10^{18}$ cm^{-3} and $1x10^{19}$ cm^{-3}, and wherein a PN junction generated by counter-doping with the pentavalent substance is in about a middle of the second doping layer; and

a third doping layer that is doped with the trivalent substance, the third doping layer being adjacent to the collector, wherein the third doping layer comprises a concentration of the dopant that is between $5x10^{18}$ cm^{-3} and $1x10^{20}$;

wherein the second doping layer is between the first doping layer and the third doping layer, and wherein the second doping layer has a lower concentration of the trivalent substance than both the first doping layer and the third doping layer;

wherein the first doping layer, the second doping layer, and the third doping layer are separated from the emitter region by a portion of the base layer; and

wherein the base layer comprises carbon atoms having a concentration greater than $1x10^{18}$ cm^{-3}.